

RCA89068 (JP10257447) ON 7572

- (19) Patent Agency of Japan (JP)
- (12) Official report on patent publication (A)
- (11) Publication number: 10-257447
- (43) Date of publication of application: 25.09.1998
- (51) Int.Cl. H04N 7/025
 - H04N 7/03
 - H04N 7/035
 - H04N 5/445
- (21) Application number: 9-061090
- (22) Date of filing: 14.03.1997
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- (54) Title of the invention: Receiver for plural broadcast services
- (57) Abstract:

Problem to be solved: To simultaneously display plural services as a list when confirming the viewing history or the reserved program of pay-by-view programs or displaying mail by providing a menu system partially or entirely commonly to plural broadcast services.

Solution: An input signal is inputted from an antenna 310 through a tuner 311 and descrambled by a descramble circuit 314 after demodulation and error correction processing at an input processing circuit 312. The output of input processing circuit 312 is a fixed length packet stream multiplexing plural programs or

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control information and the selection out of that stream is performed while controlling a demultiplexer circuit 313 through a CPU 321 according to a request from a remote controller 33. Namely, only the packet of video and audio signals in the selected program is sent to the following stage and the other packet is ignored. The selected video or audio data are converted to original video signals 317 or audio signals 318 after decode processing through the MPEG decoder 315. At the time of viewing the pay-by-view program, its information is transferred from the CPU 321 through a MODEM 324 by a telephone line.

[Claims]

[Claim 1] The receiver set for plural broadcast services characterized by preparing all or a part of menu systems in common to plurality of such broadcast services in the receiving set that can receive plurality of broadcast services.

[Claim 2] The receiver set for plural broadcast services according to claim 1 characterized by displaying all the functions that can be used by either of the mentioned above plurality of broadcast services as a menu item in the mentioned above menu system.

[Claim 3] The mentioned above menu system of the purchase of a program, or it is the one that relates to management processing of reservation and the receiver set for plural broadcast services according to claim 1 characterized by receiving plurality of receivable

broadcast services and integrating management of reservation.

[Claim 4] The purchase of the mentioned above program, reservation and already purchased program, the receiver set for plural broadcast services according to claim 3 that investigates whether at least a time zone and a part of reserved program overlaps and it warns a user.

[Claim 5] The receiver set for plural broadcast services according to claim 3 characterized by being what displays the list of the pay program which management processing of the mentioned above program already purchased and or summary of the reserved programs in a list on TV screen with the information which identifies the source of broadcast of the program.

[Claim 6] The receiver set for plural broadcast services according to claim 1 characterized by displaying an e-mail including the e-mail processing for managing the e-mail with which the mentioned above menu system is transmitted from plurality of broadcast services with the information that identifies the source of broadcast of plurality of broadcast services.

[Claim 7] The receiver set for plural broadcast services according to claim 1 characterized by the mentioned above menu system carrying out integrated management of this hardware test indicator to plurality of receivable broadcast services including the hardware test indicator of a receiver.

[Claim 8] The receiving circuit of plurality of broadcast services and the extract circuit that extracts the information transmitted from a broadcasting station from the output of the mentioned above receiving circuit, the store circuit that relates with the identification information that identifies the broadcast service that transmitted the information for the contents of the information extracted in the mentioned above extract circuit and is stored according to directions, the input circuit that inputs a display demand and the read-out circuit that reads the information transmitted from the storage means based on the mentioned above display demand, also, the receiving set of plurality of broadcast services that consist of a display screen signal creation circuit that creates and outputs a display screen signal based on the transmission information and identification information that were read from the mentioned above read-out circuit based on the mentioned above display demand.

[Claim 9] The receiving circuit of plurality of broadcast services and the extract circuit that extracts the transmission information transmitted from a broadcasting station from the output of the mentioned above receiving circuit, the store circuit that relates the contents of the information extracted in the mentioned above extract circuit with the broadcast service that transmitted the information, and stores it, the input circuit that inputs a selection demand and the selection

circuitry that chooses the transmission information that should be stored from the mentioned above extracted transmission information based on this selection demand, the receiving set of plurality of broadcast services that consist of a comparator circuit that compares the transmission information stored in the mentioned above selected transmission information and the mentioned above store circuit based on the mentioned above selection demand and a warning circuit that warns based on the output of this comparator circuit. [Claim 10] The receiver set for plural broadcast services that consist of the receiving circuit of plurality of broadcast services, the store circuit that relates the information corresponding to plurality of the mentioned above broadcast services with the identification information of related broadcast service and stores it, the input circuit that inputs a display demand, an information read-out circuit that reads the information corresponding to plurality of the mentioned above broadcast services according to this display demand and a display screen signal creation circuit that creates a display screen signal common to plurality of the mentioned above broadcast services based on the output of this read-out circuit.

[Detailed description of the invention]

[0001]

[Field of the invention] In the broadcast receiving set that can receive a plurality of broadcast services (broadcast service means that it can transmit a plurality of channels, respectively), this invention carries out integrated management of the menu system used for actuation of a receiving set including purchase, reservation, etc. of a program by plurality of broadcast service compartments and relates to plurality of broadcast service receiving set that communalized the user interface and aimed at improvement in operability.

[0002]

[Description of the prior art] Digital broadcasting using a satellite is put in practical use, for example, it can view the program of about 100 channels in one system. Thus, the function of an electronic program guide is necessary.

[0003] Also about digital broadcasting of satellite use, plurality of kinds of services, for example, PerfectTV, JskyB, etc., are proposed and the respectively separate receiving set is needed by current. However, to be able to use plurality of broadcast services with a common receiving set in the future is desired. And when it corresponds with a common receiving set to plurality of digital broadcast services, it is desirable to combine actuation of the user too.

[0004] For example, the configuration that changes a format of EPG (electronic program guide) in both

systems and displays EPG integrated in the system that can receive terrestrial broadcasting and satellite broadcasting service is shown in JP 8-275077 A (H04N 5/445).

[0005]

[Problems to be solved by the invention] Thus, in the receiving set that can receive plurality of broadcast services, it is desirable to realize operability for which a user is not senses the difference between plurality of broadcast services as much as possible. For example, functions, such as the purchase of a program and actuation of reservation, reception of an e-mail, may differ by plurality of broadcast service compartments. Also in this case, it is desirable that it can be operated according to the menu for every broadcast system that a user enables it to choose and the unified menu.

[0006] Also, although the receiving set is equipped with the individual purchase (pay per view) of a pay program and the function to perform program reservation, in digital satellite broadcasting, in the receiving set that can correspond to plurality of broadcast services, it is desirable to control equipment, so that problems, like reservation time amount laps in plurality of broadcast service compartments about these functions do not arise.

[0007]

[Means for solving the problem] In this invention, in order to integration manage and to display the menu of plurality of broadcast services, it is characterized by

displaying all the things in which the menu item that can be used by each digital broadcast service carried out OR, i.e., the function that can carry out digital broadcast service use of either, as a menu item. Also, change actuation of digital broadcast service can be made unnecessary by communalizing the mentioned above program guide display and displaying all channels.

[0008] Also, in another description of this invention, it displays by storing the transmission information of the program transmitted from the broadcasting station with the identification information for identifying a broadcasting station. Additionally, in case this transmission information is stored, duplication to the already stored transmission information is investigated and it is warns when there is duplication.

[0009]

[Embodiment of the invention] First, the general matter about digital broadcasting using a satellite is explained. Drawing 7 shows the image of digital broadcasting that uses a satellite. In drawing, (1) is a satellite and (2) show a sending station and (3) shows a receiving station. A sending station (2) consists of n encoding systems (20), the RF processing section (21), a transmitting antenna (22), and a customer management system (23). The MPEG encoder with which an encoding system (20) considers a video (200) and an audio (201) as an input (202). The scramble circuit for scrambling the output of the MPEG encoder (207), the limited reception circuit

for controlling a scramble (205) consists of the output-processing sections (206) that perform the multiplexing circuit (203), error correction and digital modulation that consider output of m scramble circuits, program guide information (204) and limited receipt information from a limited reception circuit (205) as an input.

[0010] Also, an accepting station (3) consists of a receiving antenna (30), a digital-broadcasting receiver (31) (it is usually called an integrated receiver / decoder and outlines following IRD), an IC card (32), remote controller (33) and TV (34).

[0011] First, signal processing by the side of a sending station (2) is explained. The MPEG encoder (202) inputs video (200) and audio (201) signal, carries out MPEG encoding processing and constitutes one channel.

Although a channel means the band where a program feeder can transmit one program like the conventional analog broadcasting, it is not equivalent to one frequency band (in the case of satellite broadcasting service, it is a transponder), like the conventional analog broadcasting. Thus, since plurality of programs by one transponder can be transmitted in digital broadcasting, so that it may mention later, a transponder and a channel do not correspond to 1 to 1, but a plurality of channels share one transponder. Here, m channels shall reside in one transponder. That is, m MPEG encoders input a video and an audio signal, respectively, and MPEG encoding is carried out.

The output of m MPEG encoders is inputted into a scramble circuit (207) in order to scramble a video and an audio signal.

[0012] A scramble circuit (207) carries out scramble processing by data processing of the video and the audio signal by which MPEG encoding was carried out, so that the same number (m) existence as the MPEG encoder might be carried out and it might mention later and the scramble key information from a limited reception circuit (205). The output of each scramble circuit is inputted into a multiplexing circuit (203) and multiplex is carried out to one bit stream data. After multiplex means time division multiplexing and data, such as a video and an audio, are divided into a fixed length packet, multiplex is carried out according to occurrence frequency. Also, encoding processing and multiplexing processing of MPEG video and audio are indicated by ISO standard ISO13818-1-3.

[0013] Although the number of channels transmitted by one transponder was set to m , these channel are several m , it restricts that it is not the same at transponders, but changes with contents of a program. This is explained below.

[0014] Although the data by which MPEG compression was carried out are changed into one bit stream, the output bit rate changes with the videos and the audio signals that are inputted. For example, in the case of a general TV program like a drama, it consists of 30

frames per second and, in the case of 24 frames per second, the bit rate after MPEG compression was carried out is 3 - 4Mbps like a movie to about 5 Mbps. Also, in a program with many intense scenes of a motion like a sport, it is about 6 Mbps in the same TV signal.

[0015] Also in compression of an audio signal, in the case of music it is the 224 kbps ~ 384 kbps, in case like the voice of news it can be transmitted with a lower bit rate.

[0016] The total bit rate that can be transmitted by one transponder and although it calls also at the frequency band of a transponder, except for a redundant bit required for an error correction, are about 30 Mbps. When following, for example, transmitting only sports programs by one transponder, only about 5 program extents can be sent, but if constituted only from movies, 7 - 9 program transmission is possible. Thus, the numbers of channels (m) that can be transmitted by one transponder according to the class of program by which multiplex is carried out differs.

[0017] Also, the data by which MPEG video compression was carried out fundamentally change not according to a fixed rate but according to the pattern of video within one channel. That is, on a scene to which a fine pattern like leaves moves, there are many amounts of output signs after compression, and there are few amounts of output signs on a scene on which the whole screen is standing still.

[0018] Thus, it is necessary to constitute each channel that is a variable-length bit string as a bit string fixed-length in the mentioned above multiplexing circuit (203). Although different methods can be considered to this, the method that assigns a fixed length bit rate to each channel can be considered, for example. In this case, in order to absorb change of the amount of output signs according to a pattern, when there are few amounts of signs, a dummy bit is inserted, and when there are many amounts of signs conversely, the data of the part that is not very important are reduced, so that it may be restored to the assigned bit rate. Specifically, the quantization property of quantization of the DCT multiplier after DCT conversion is changed.

[0019] In order to make it not reduce data, it is necessary to make many assignments of a bit rate to a channel and in the case of this method, the number of channels that can be transmitted by one transponder in that case decreases. There is much ineffectiveness in a program with an especially large change of the amount of output signs.

[0020] The method to which the bit rate assigned to each channel is dynamically changed as an option can be considered. According to this method, to a channel with the large amount of signs, bit rate many assignments are made at the moment of multiplexing, bit rate assignment is lessened to a channel with the small amount of signs and it controls to become a fixed length as total. This

amount control of signs is performed in the mentioned above multiplexing circuit (203).

[0021] It may not restrict at a time in one video and audio that are inputted into one MPEG encoder (202), but they may exist. That is, one program consists of two or more videos and audios. For example, it is the case where several languages and transmission of the image that several cameras caught simultaneously are added and sent in a golf program etc. Also, there is a channel of only an audio like a music channel. Multiplex of program guide information (204), the limited receipt information from a limited reception circuit (205) or the mail data (208) is carried out by a multiplexing circuit (203) together, so that it may mention later not only in the video by which MPEG encoding was carried out, and an audio signal. The fixed-length packet track outputted from a multiplexing circuit (203) is modulated after carrying out encoding processing of an error correction in the output-processing section for the cure against an error under transmission. In the case of digital satellite broadcasting, as for error correcting system, the concatenated code of a Reed Solomon code and a convolutional code is used and as for a modulation, generally, QPSK modulation technique is used.

[0022] An encoding system (20) consists of plurality according to the frequency band that can be used by digital broadcast service, and the number (n) of encoding systems (20) becomes equal to the number of

transponders at the case of the number of carriers, for example, satellite broadcasting service. While carrying out a rise convert, according to the carrier frequency of a transponder, it carries out frequency multiplex of the output of these n encoding systems to a frequency band (for example, 12 GHz band) predetermined in the high frequency processing section (21). The output signal from the RF processing section (21) is transmitted towards a satellite (1) from a transmitting antenna (22).

[0023] Next, the processing on the side of a receiver is explained. In a receiving side, processing contrary to a transmitting side is performed fundamentally. The example of an internal configuration of IRD (31) is shown on drawing 10. The signal from a receiving antenna (30) is inputted into a tuner (311) and one frequency (in the case of satellite broadcasting service, it is a transponder) is chosen. As for the output of a tuner (311), recovery and error correction processing are performed in an input processing circuit (312). Descramble processing of the output of an input processing circuit (312) is carried out in a descramble circuit (314). The output of an input processing circuit (312) is the fixed length packet track to which multiplex of plurality of programs or control information was carried out and this is equivalent to the output of the multiplexing circuit (203) of a transmitting side. Thus, fundamentally, descrambling processing descrambles only the program that a user chose and does not carry out

descrambling processing to the program or control information used as the candidate for selection.

[0024] Key information required in order to carry out descrambling processing is sent from CPU (321). The output of a descramble circuit (314) is divided into a video, an audio signal, a program guide information (319), and limited receipt information (320) in a demultiplexer circuit (313). The program guide information (319), limited receipt information (320), and mail data (325) are incorporated by control of CPU (321) to RAM (random access memory) (323) and video and audio data are inputted into the MPEG decoder (315). The number of the programs by which MPEG decoding is finally carried out is one and choosing one from the program by which several multiplexes were carried out is performed when CPU (321) controls a demultiplexer circuit (313) by the demand from the remote controller (33) by a user etc. That is, only the video of the program that the user chose and the packet of an audio signal are outputted to the latter part and other videos and audio packets of a program ignore.

[0025] MPEG decoding of the selected video and audio data is carried out by the MPEG decoder (315), and they are changed into an original video (317) and an original audio signal (318). The MPEG decoder (315) consists of cascade connection of the PAL/NTSC encoder for usually changing the output data of the MPEG decoding IC and the MPEG decoding IC into NTSC or the video

signal of PAL. Also, this PAL/NTSC encoder is equipped with the anti-copying processing facility for the video recording prevention mentioned later.

[0026] Nonvolatile memory (326), such as EEPROM for storing the information or mail data of RAM (316) for storing the bit map data for the onscreen display which the data for decoding buffer and mention later and the viewing history of a pay program or a reservation program, is connected to the MPEG decoding IC. RAM (323) for the temporary storage of the ROM (read-only memory) (322) and the various data that store the code of control software is connected to CPU (321). Also, it communicates with an IC card (32) for limited reception.

[0027] The one chip microcomputer is embedded into the IC card and the electric contact for a communication link is prepared in the front face. This IC card is inserted in the IC card connector in IRD (31) from insertion opening (a slot) prepared in IRD (31). In this case, the IC card (32) used is called a smart card and that physical and electric specification, communications protocol, etc. are described in ISO/IEC7816-1-3.

[0028] For example, as for the information when pay program is viewed and listened from CPU to a modem (324) with the telephone line, the mentioned above customer management system of a sending station is transmitted periodically (1 time in one month).

[0029] Remote controller (324) is used for selection of the menu later mentioned besides choosing a program,

selection, decision when alternative is displayed by onscreen display, etc.

[0030] The example of a button of the remote controller for digital-broadcasting receivers is shown on drawing 11. The guide key for displaying a program guide on remote controller, as shown on drawing (33G), the cursor movement key (33L) (33R) for moving the cursor displayed on the menu screen key (33M) for displaying a menu, and the onscreen screen in four directions (33U) (33D), the selection key for choosing a program on a program guide or choosing and determining an item menu on display (33S), Ten keys for inputting a channel number directly (330) - (339) are usually prepared, and the information on the pressed key is transmitted to CPU (321) by IRD (31) via infrared radiation. Although it is also possible to carry out to send a command equivalent to the keying signal of remote controller etc., and to control from an external personal computer, when it can be prepared in an IRD body or the button that has the same function as a remote controller key prepares the interface of dedication in IRD and enables it to communicate with CPU (321), the actuation from a user is explained below as what is performed with remote controller.

[0031] Next, the program guide, the menu display and limited reception that used the deep onscreen display of this invention and relation are explained in details also including processing of the transmitting side.

[0032] First, an onscreen display function is explained. With the receiver of the conventional analog broadcasting, although it was enough just to receive and display about ten channels maximum, while the number of channels increases sharply, by digital broadcasting, various functions in addition to reception of a program are added. For example, in PerfecTV, the number of channels is about 70 channels additionally including a music channel and the program of about 200 channels is broadcast in DSS (digital satellite system) by which service was started in June, 1994 in North America. The function that displays program information on TV screen as a program guide in order to assist choosing from the program of these many programs that a user wants to watch is required. Also, when it may be transmitted through radio and mail data is transmitted with video and audio data, the function that receives this mail data and displays on TV screen is needed.

[0033] Also, it has a systems testing function for a self-test. A systems testing function is a function for testing of an interface with the internal memory and IC card of IRD or the telephone line. The reason a systems testing function is needed is that it may have serious effect for receiver actuation if these new interfaces have the important function in the receiver and a problem is in these interfaces while the unnecessary interface is required for a conventional TV receiver called in IRD connection with an IC card or the telephone line.

Also, if there is a systems testing function, when a receiver does not operate correctly, the fundamental test of these interfaces can be performed easily.

[0034] An onscreen function becomes necessary in order to perform these functions. An image carries out graphical display of different information to coincidence independently, and, as for an onscreen function, a required graphic screen is displayed on TV screen according to the condition inside the directions or IRD from a user. In order to perform graphical display, the function of the MPEG decoding IC used by the MPEG decoder (315) is used. For example, the onscreen display capabilities in the case of using the MPEG audio / video decoding IC of SGS-Thomson (STi3520) are described by the data sheet of this IC in details. Although Book IC is IC for outputting the video and the audio signal by which MPEG encoding was carried out as the component digital video signal with which ITU-R656 specification format is also based and a PCM audio signal, it is possible to mix an onscreen display with an output video signal, and to output it as an addition function. In order to perform an onscreen display, bit map data are transmitted to the predetermined address of External RAM (316) through the register in the MPEG decoding IC from CPU. The transmitted data are mixed in the mixing circuit inside MPEG decoding IC based on the video signal by which MPEG decoding was carried out and the following formulas.

[0035]

[Equation 1]

$$V_o = (1 - \alpha) \times V + \alpha \times V_{osd} \dots (1)$$

[0036] Here, the output level after V_o was mixed, the video signal with which MPEG decoding of the V was carried out, and V_{osd} are the level of onscreen data, and a ratio that α mixes. 16 steps of setup are possible for the mixing ratio α from 0 to 1. That is, if it is $\alpha = 0$, a video signal will be outputted as it is, if it is $\alpha = 1$, a video signal will not be outputted but only onscreen data will be outputted. Also, if it is $0 < \alpha < 1$, a video data and onscreen data are mixed and it is outputted, and on TV screen, an onscreen display penetrates and an image is transparent and it is in sight.

[0037] The main things as a function realized by this onscreen display are shown below.

A program guide display

B Purchase processing

C Viewing history display of a pay program

D Reservation program display of a PPV program

E E-mail display

F systems testing

These functions can be roughly divided into two kinds.

A and B are program guide-related and C-F is a menu-related function. Although a program guide can also be considered to be one of the menus, operating frequency is treated as an independent function compared with

other functions in many cases. It is explained in details below also including the operating instructions of the user who used these functions and remote controller.

[0038] The program guide display of A is a function that displays the contents of a program (not broadcast yet) of a broadcast schedule during current broadcast on TV screen using the program guide information sent from a sending station. Program guide information transmits the information about the program of a broadcast schedule during the present broadcast as text information, and multiplex is carried out with video and audio data by the transmitting side (104 on drawing 7). Although the data format of this program guide information is proper thing for every digital broadcast service, the class of information transmitted is similar and information as usually shown below is transmitted.

- * Program title
- * Start time
- * End time (or the length of a program)
- * Program price (in the case of a pay program)

Such information is sent as program information over each program of all the channels from current time to time of day 24 hour after. The program detailed information that described the contents of the program in addition to the above, the rating information on a program or the category information on a program, etc. may be included.

[0039] It is shown whether rating information is a program for children or it is a program for adults and it is expressed using age or a standard rating name (rating names, such as R and NC-17, are used in the US). If it is the case of age, for example 15 and age is lower than 15 years old, it means that it is not desirable to watch the program. This rating information is used in order that parents may usually restrict the program that a child watches. Thus, the upper limit of rating considered that you may show it to a child's age or a child is preliminary set up by the terminal side, and if the rating information on the program to which it was going to view is over the set point, it will control to be unable to watch a program. In order to watch a program, it is necessary to enter the password (usually four digits) registered beforehand. When parents manage this password, a child can be prevented from watching the excessive high program of rating.

[0040] Also, the category information on a program shows the attribute of the program and shows the genre of the program that are a sports program, for example, it is a movie. In case a user chooses a program by the terminal side, this information is used in order to search a program to watch. For example, when I wish to watch a sports program, a program can be easily chosen by limiting and displaying the mentioned above program guide information displayed on TV screen on the

program that has the category information on a sports program.

[0041] At an receiving station (3) side, a user can know a program configuration with the feeling that looks at the newspaper program column by receiving this program guide information, using an onscreen function and displaying on TV screen by considering information about the program of a broadcast schedule during the present broadcast as a program guide. The example of the concrete data-processing approach is described below.

[0042] By processing of CPU (321), it considers by the receiving side that the program guide information by which multiplex was carried out as mentioned above by the sending station side is the 2 dimensional array information that a lengthwise direction is a channel number and a longitudinal direction is time amount as shown on the drawing 12 bottom and the index table that can be accessed using the slot number that shows a channel number and time of day is created. The slot number is a number given for every unit for 30 minutes. Also, the field E of the 2 dimensional array corresponding to all the program guide information shown on the drawing 12 bottom will be called all program guide fields. When a user pushes the guide key (33G) of remote controller, call appearance of the program guide is carried out. When a program guide is called, based on the channel number, the current time

and the index table that were chosen immediately before, CPU (321) creates a display table as shown on drawing 13.

[0043] Program guide information is stored in each small field in the field except one leftmost track (it is called a cel) in drawing 13. Thus, in this example, the display table corresponding to the program guide for five channel x5 cel (it is equivalent to 2 hours and a half) is created. The data of a channel number (absolute channel number) or the channel name corresponding to the channel number are stored in each cel of one track of most left-hand side. In drawing 13, x shows a channel relative number having been indicated as an index for every cel (x y) (it is a relative channel number between each cel in a display table, and is not an absolute channel number), and y shows the slot relative number (it is the relative slot number between each cel in a display table, and is not the absolute slot number). The 2nd cel S0 will be called a criteria cel from the left of the maximum upper case.

[0044] The program guide display information corresponding to the channel number and current time that were chosen immediately before is stored in the criteria cel S0. The program guide display information stored in each cel consists of a title name, the number of monopoly cels, rating, a category, etc. The number of monopoly cels means the number of cels contained by the cel which the program concerned ends from the cel

concerned. Thus, when the program concerned is completed in the cel concerned, the number of monopoly cels is set to 1. Thus, based on the created display table, the bit map data of the image corresponding to a program guide screen as shown on the drawing 12 bottom are transmitted to RAM (316) connected to the MPEG decoder (315) from CPU (321), and are displayed on TV screen.

[0045] Drawing 14 shows the procedure of display processing of the program guide screen performed by the onscreen function of CPU (321) and the MPEG decoder (315). If a program guide is called, the channel number and current time that were chosen immediately before will be read, and a criteria cel will be set up from all program guide fields (refer to drawing 12) (step S1). The display table of drawing 13 is created based on the criteria cel and index table that were set up (step S2). Based on the information in this display table, CPU (321) generates a program guide image, and that bit map data is transmitted to the MPEG decoder (315).

[0046] In the MPEG decoder (315), it changes into the image data for displaying on TV screen (34) based on the sent information, and outputs to TV screen (step S3). Then, it will be in the state waiting for an input of a key of a remote controller. When there is a selection key input by the selection key (33S), predetermined selection, program selection, program reservation, processing, etc. is performed by (step S4 of YES).

About program reservation processing, it mentions later. When there are a cursor movement key (33L) and a cursor key input by (33R) (33U) (33D), according to the operated cursor movement key (33L), (33R), (33U) and (33D), processing of steps S6, S7, and S8 or S9 is performed at the (step S5 YES). That is, when the operated key is a left movement key (33L), it progresses to step S6 and it is judged whether it was ordered in the movement leftward from the left end of all the program guide fields E. When the operated key is a right movement key (33R), it progresses to step S7 and it is judged whether it was ordered in the movement rightward from the right end of all the program guide fields E.

[0047] When the operated key is an upper navigation key (33U), it progresses to step S8 and it is judged whether it was ordered in the migration above from the upper limit of all the program guide fields E. When the operated key is a bottom navigation key (33D), it progresses to step S9 and it is judged whether it was ordered in the migration down from the lower limit of all the program guide fields E.

[0048] When ordered in the movement leftward from the left end of all the program guide fields E (it is YES at step S6), When ordered in the movement rightward from the right end of all the program guide fields E (it is YES at step S7), when ordered in the movement above from the upper limit of all the program guide fields E (it is

YES at step S8), since cursor cannot be moved when ordered in the movement down from the lower limit of all the program guide fields E (i.e., when it is the movement command to the outside of all the program guide fields E) (it is YES at step S9), it will be in the state waiting for a return key input at step S4.

[0049] When the cursor advance command by the cursor key input is a movement command in a program guide field, the location of the migration place of cursor is computed (step S10). When a cursor advance command is a movement command of a longitudinal direction, the location of the migration place of cursor is computed considering movement magnitude as a part for one cel of a longitudinal direction (a part for one slot). When a cursor advance command is a movement command of the vertical direction, the location of the movement place of cursor is computed considering movement magnitude as a part for one cel of the vertical direction (one channel). And when the location of the cursor advance point is in the program guide screen currently displayed on (34) on TV screen, a program guide image is updated, so that cursor may be displayed on the location of a movement place (step S12).

[0050] When the location of the cursor advance point is the outside of the program guide screen currently displayed on (34) on TV screen, in order to make a program guide screen change (scrolling), modification processing of a criteria cel is performed (step S13).

In modification processing of this criteria cel, it considers as a criteria cel with the new location from which only the amount of cursor advances was separated in the direction of a cursor advance to the current criteria cel among all the program guide fields E. If a new criteria cel is set up by modification processing of a criteria cel, it will return to step S2. Thus, based on the newly set-up criteria cel, the display table of drawing 13 is created and a new program guide screen is displayed on TV screen (34).

[0051] Thus, if the program is broadcasting by pressing a selection key (33S) after moving cursor to the location using a cursor movement key, if there is a program that wants to see, view a program title on the program guide displayed on TV screen (34), it will tune in to the channel of the program automatically, and a program will be displayed on (34) on TV screen. Channel selection actuation is performed by taking out a command from CPU (321) to a tuner (311), an input processing circuit (312), and a demultiplexer circuit (313). Namely, while issuing a command, so that it may tune in to a tuner (311) to the transponder containing the channel of the program that the user chose, the error correction parameter corresponding to the signal currently transmitted by the this selected transponder is set up to an input processing circuit (312). It is controlled to separate the video and audio data of a program which the user chose out of several programs

included in the transponder tuned in to the demultiplexer circuit (313), and to output to the MPEG decoder (315).

[0052] The selection art of video and audio data is explained briefly. Each video and audio data by which MPEG encoding was carried out and multiplex was carried out by the transmitting side can assign the ID number of a proper, respectively, and when packed, multiplex of the ID number is carried out to a part for the header of a packet. If a user chooses a program from on a program guide, a command will be taken out from CPU (321) to a demultiplexer circuit (313), so that video with the ID number of the video corresponding to the selected program and audio and the packet data of an audio may be extracted. The selected program is a pay program, viewing is not permitted or when it is the program that is not broadcast yet, it is controlled by limited reception mention later.

[0053] Next, the purchase of the pay program of A is explained. Limited reception is profoundly related to the purchase of a pay program and after explaining the general limited reception in the case of being digital broadcasting first, the purchase processing of a pay program based on control of the limited reception is explained. In order for pay programs, such as not only a free program but PPV (pay per view), to exist in the program transmitted by digital broadcasting and to view those pay programs, it is necessary to perform, procedure, for example, a channel contract etc.,

predetermined by the user side etc., and the user who has not done such a procedure is controlled to be unable to view. Thus, it scrambles and transmits in a scramble circuit (207), so that it cannot reproduce, even if it receives a video and an audio signal as it is, in case it encodes by the transmitting side and it is controlled that only the user who performed the mentioned above predetermined procedure can cancel a scramble (descrambling).

[0054] Although a scramble method changes with digital broadcast services, it is explained in the Nikkei electronics (1996.9.2, No. 669, page 157) about the limited receiving method adopted by digital satellite broadcast service "PerfecTV" which service was started on October, 1996 in Japan. The limited reception structure of a system of the transmitting side and receiving side that made the conditional access system of PerfecTV, the example is shown on drawings 8 and 9, respectively. First, the configuration of a transmitting side is explained. In drawing in a limited reception circuit (205) Ks encryption circuit for encrypting a scramble key generation circuit (2050) and a scramble key (next Ks) (2051), the work piece key generation circuit for generating the key information for encrypting Ks (2052), The master key generation circuit (2054) for generating the key information for encrypting Kw encryption circuit (2053) for encrypting a work-piece key (next Kw) and Kw is included.

[0055] The video and audio data from the MPEG encoder (202) are scrambled in a scramble circuit (207). In PerfectTV, the block cipher system called MULTI2 method that Hitachi, Ltd. developed as a scramble method is adopted. A block cipher system is a method that divides data into a certain length, and is encrypted in the unit, and it is usually processed every 64 bits. In case it scrambles, Ks is needed and it consists of 64-bit data of the same length as the block length of block encryption. Ks is generated in Ks generation circuit (2050). It can return to data before scrambling by descrambling by the receiving side using the same key as this Ks.

[0056] Thus, although it is necessary to transmit this Ks to a receiving side with video and audio data, when Ks is transmitted as it is, there is a danger of Ks being decoded by the 3rd person and viewing a pay program. Then, as a cure against this while changing Ks for every fixed time amount, encrypting Ks using still more nearly another key is performed. Encryption of Ks is performed in Ks encryption circuit (2051) and the key information for encrypting is generated in Kw generation circuit (2052). This Kw is encrypted in Kw encryption circuit (2053) using still more nearly another master key (next Km). The output of Ks encryption circuit (2051) and Kw encryption circuit (2053) is needed in order to decode Ks by the receiving side and multiplex is carried out as

limited receipt information in a multiplexing circuit (203).

[0057] Although K_s and K_w are common to all users, K_m differ for every user. Thus, among the limited receipt information transmitted, although the output (the following, ECM: entitlement control message) of K_s encryption circuit (2051) is common data, the output (the following, EMM: entitlement money message) of K_w encryption circuit (2053) serves as data of a proper user. Usually, the transmitting frequency of ECM is about 10 times/second highly compared with EMM. Since it is necessary to send EMM for every user, transmitting frequency is low and is 1 time / about 10 minutes. K_m does not need to transmit and is beforehand recorded in the IC card (32) of a receiving side.

[0058] In addition, in order to prevent the leakage to the 3rd person of the encryption technique of ECM and EMM, it considers as the secret matter severely and generally it is not indicated. Thus, it shall have K_w from which K_m differs for every program when it shall differ for every channel in a channel contract and purchases in program units, such as PPV, on account of explanation. The data to which a user should transmit EMM by what kind of channel contract is carried out differ, and this control is performed by the customer management system (23).

[0059] Next, a receiving side is explained. The limited receipt information (ECM, EMM) separated in the

demultiplexer circuit (313) as shown on drawing 9 is decoded within an IC card through CPU (321) and CPU in an IC card (32C). In the card, K_m is recorded preliminary (32M), and K_w is decoded from EMM that received in K_w decryption circuit (32W) using the K_m . Also, K_s is decrypted from ECM that received in K_s decryption circuit (32S) using K_w decoded in K_w decryption circuit (32W). K_s decoded in K_s decryption circuit (32S) is transmitted to a descramble circuit (314), and descrambling of the video of a predetermined program or audio data is performed. Also, EEPROM in an IC card (32E) is used in order to record the information on the pay program to which it viewed.

[0060] Next, the viewing approach of the pay program by these limited reception systems is explained. Also, about a free program, it is one of the ability to view whether the scramble is applied to video or audio data or even if are applied and all users do not do special processing at all and anyone can view. In order for a user to watch a pay program, two either needs following to be processed fundamentally.

- a) It carries out a channel contract and can view to all the programs of the channel.

- b) It purchases per program (PPV).

First, the channel contract of a is explained. In order for a user to do a channel contract, the mentioned above customer management system (23) of a transmitting side is called, and ID (preliminary assigned to a receiver) of

the channel and user who wish is connected. In a transmitting side, if a viewing application is received from a user, using K_m corresponding to a user's ID, K_w about a contract channel will be encrypted in K_w encryption circuit (2053), and it will transmit as EMM. This EMM can be decoded only by using K_m of the user who proposed to that channel contract. If EMM is received by the receiving side, the original K_w will decode in K_w decryption circuit (32W) within a card. It can view now the program of the channel a contract was made by decoding K_s from ECM using decoded K_w . Decrypted K_w is held in an IC card until it is updated next.

[0061] When a user does plurality of channel contracts, K_w from which plurality differs will be held. K_w is good by the contract channel at one K_w , when not restricting that one surely exists in one channel but making a contract of plurality of channels collectively. The selection approach of a program is the same as that of a free program, by moving cursor to a program watching from a program guide screen as mentioned above, and pressing a selection key (33S), if it is under broadcast, will be tuned in automatically and will be displayed on TV screen. The payment of the audience fee in a channel contract is usually processed by the monthly contract irrespective of whether it viewed the program of the channel.

[0062] Next, viewing of a PPV program is explained. In the case of a PPV program as well as a channel contract, purchase by the telephone is possible and it is the same as that of the case of the above mentioned channel contract in this case. However, there is a method called IPPV as a program purchase method peculiar to digital broadcasting and since purchase procedure is easier than purchase by the mentioned above telephone, it is usually purchased by IPPV. IPPV is the abbreviation for impulse PPV, and the application by the telephone is unnecessary and it is good only at actuation with remote controller. In order to view a PPV program, it is necessary to perform purchase processing.

[0063] The case of the PPV program under current broadcast and in the case of the program of a broadcast schedule, it divides and this program purchase processing is explained. In the case of the program under broadcast, if the program is a PPV program when a program is chosen from the mentioned above program guide, a program purchase screen as shown on drawing 15 will appear. (40), (41), and (42) are the buttons to which cursor can be moved and it is shown that cursor exists in the location of (40) now. Cursor carries out expressing as a different color etc. (highlights), and is distinguished from other buttons. Movement is performed by the up and down cursor movement keys (33U) and (33D).

A button (40) is a viewing buy button, and if a selection key (33S) is pressed when cursor is in this location, it can purchase, view the selected program.

[0064] A button (41) is a video recording buy button and if a selection key (33S) is pressed when cursor is in this location, the video recording of the selected program is possible for it. Thus, being divided into two, the case of only viewing, and a video recording, anti-copying processing is performed to an output video signal and PPV programs, such as a movie, are outputted to it so that it cannot record on videotape to VCR etc. as it is, and in the mentioned above video recording purchase, this anti-copying processing is canceled and they are usually outputted. However, compared with the case where the way of the program price in video recording purchase is usually viewing purchase, it becomes high.

[0065] A button (42) is a Cancel button, and if a selection key (33S) is pressed when cursor is in this location, it will return to the original screen, without purchasing a program. In this case, it cannot view the selected program. In the program information-display field (43), program information, such as a title of a program and start time, is indicated. Such program information is acquired from program guide data. When purchase processing is completed and a user purchases a program, a receiver acquires ECM corresponding to the program and can reproduce a program by decoding Ks.

In this case, EMM that can purchase all PPV programs shall be preliminary transmitted by carrying out the contract that EMM can view PPV.

[0066] That tariff information on the PPV program to which it viewed in the case of PPV whenever it viewed a program etc. is recorded on EEPROM inside an IC card (32E) differs from the case of the program of a channel contract or a free program. The tariff information in an IC card is transmitted to a customer management system (23) periodically (it will be 1 time in January). Thus, IRD (31) is equipped with the function that calls a customer management system automatically. Thus, according to the IPPV purchase method, there is no need that a user telephones one by one and it can be purchased only by remote controller actuation.

[0067] Next, although it is the case of the program of a broadcast schedule, reservation processing is performed in this case. On the program guide, reservation processing is chosen preliminary and registers the program of the broadcast schedule that is not broadcast yet. Reservation processing is divided into the following two kinds and is treated in many cases.

- 1) reservation with viewing purchase
- 2) reservation with video recording purchase

The processings, when the start time of the reserved program comes, according to the class of these two reservations differ. First, in viewing purchase, if the power source of IRD (31) is turned on when program

start time comes, viewing will be demanded from a user or it will process tuning in to the channel of the program which displayed by the message from which the program reserved using the onscreen function begins and was reserved compulsorily etc. However, if the power source of IRD (31) is not on, the program reserved without processing anything is canceled automatically.

[0068] On the other hand, it is reservation to the case of video recording purchase aiming at the video recording to VCR etc. (timed recording) and when the start time of the reserved program comes, even if the power source of IRD (31) is not on, automatically, a power source is switched on and tuned in to the channel of the reserved program. In this case, in order to record on videotape automatically, VCR is interlocked, it controls and the signal from IRD is recorded on videotape.

[0069] Reservation of a PPV program is performed by the following procedures. Thus, when the program of a broadcast schedule is chosen on a program guide, a program reservation screen as shown on the mentioned above drawing 15 appears like the time of selection of the program under broadcast. If a selection key (33S) is pressed here in the location of a viewing buy button (40) or a video recording buy button (41), a program will be reserved and if a selection key (33S) is pressed in the location of a Cancel button (42), it will end, without carrying out reservation processing. Reservation of a program records the flag data in which it is shown

whether it is reservation by program information and viewing purchase, such as start time and a tariff or it is reservation by video recording purchase on EEPROM (326) in IRD (31), without carrying out channel selection processing. When it views and listens to a PPV program, the information on the PPV program to which it viewed is recorded on EEPROM (32E) in an IC card (32), and is deleted from EEPROM (326) in IRD (31). That is, the information on a PPV program finishing viewing is in (32) in an IC card, and is set as the object of audience fee payment and the information on the reserved program is in IRD (31).

[0070] Not only a PPV program but in the case of a free program or a channel contract program reservation processing is possible. In this case, it is necessary to register whether although purchase processing is unnecessary, it is reservation or video recording reservation for only viewing. Thus, when the program of the broadcast schedule of those other than a PPV program is chosen, for example, a program reservation screen as shown on drawing 16 is displayed. About a cursor display and movement, it is the same as the program purchase screen of the mentioned above drawing 15. If a selection key (33S) is pressed here in the location of a viewing reservation button (44) or a video recording reservation button (45), a program will be reserved, and if a selection key (33S) is pressed in the location of a Cancel button (42), it will end, without

carrying out reservation processing. Except for audience fee, the same program information as a PPV program is displayed on a program information-display field (46).

[0071] In the case of a PPV program, a different place from reservation processing of a PPV program is that processing of such audience fee is unnecessary to the data of the PPV program reserved from EEPROM (326) in IRD (31) to EEPROM (32E) in an IC card (32) being transmitted in the case of a free program or a channel contract program, when it became and tunes in at the start time of a program. Also, about the PPV program to which it was not viewed although it carries out viewing reservation, the information on the PPV program that was canceled automatically and was this canceled from EEPROM (326) in IRD (31) is deleted.

[0072] If the start time of the reserved program comes, the channel of the program will be tuned in, ECM corresponding to the program will be acquired, Ks will be decoded, and descrambling processing of a program will be performed. Also, after performing anti-copying processing in viewing purchase or viewing reservation, a video signal is outputted, and in video recording purchase or video recording reservation, a video signal is outputted, without carrying out anti-copying processing. This anti-copying processing is processed to the video signal after MPEG decoding was carried out in the MPEG decoder (315). Generally the method of a Macro Vision company is used for anti-copying processing.

Also, to an audio signal, anti-copying processing is not usually carried out.

[0073] The procedure of the program selection processing (it corresponds to step S14 of drawing 14) also including this reservation processing is shown on drawing 17. First, it is judged whether the selected program is broadcasting (step S15). If it is under broadcast, the program concerned will be a PPV program or no will be judged (step S16). If it is not a PPV program, it will be judged whether next, it can view the program concerned (step S17). It is the pay program that needs a channel contract and in omitting the channel contract etc., processing is ended, and it returns to the original screen that it cannot view the program concerned (step S18). If it can view the program concerned, the channel of the program concerned will be tuned in and it will display on TV screen (step S19). When judged with it being a PPV program in step S16, it is judged whether purchase processing of the PPV program concerned has ended (step S20). If purchase processing is ending, the channel of the PPV program concerned will be tuned in and it will display on TV screen (step S19). If purchase processing is not settled, the mentioned above program purchase screen is displayed (step S21).

[0074] Next, the judgment of whether the user performed purchase processing correctly is performed (step S22). When purchase processing is performed

correctly, the channel of the PPV program concerned is tuned in and it displays on TV screen (step S19). When purchase processing is not performed correctly, selection processing is stopped and it returns to the original screen (step S18).

[0075] When judged with it not being under broadcast in step S15, it is judged whether the program concerned is a PPV program first (step S23). When judged with it not being a PPV program, it is judged whether next, it can view the program concerned (step S24). It is the pay program that needs a channel contract and in omitting the channel contract etc., processing is ended, and it returns to the original screen that it cannot view the program concerned (step S18). If it can view the program concerned, it will be judged whether the program concerned is reserved (step S25). Since registration processing has already ended if reserved, it returns to the original screen, without processing anything (step S18). If not reserved, the mentioned above program reservation screen will be displayed (step S26).

[0076] Next, it is judged whether reservation processing was performed correctly (step S27). If reservation processing is not performed correctly, return (step S18) is recorded on the original screen, if reservation processing is carried out correctly, in order to register as a reservation program, program information is recorded on EEPROM (326) in IRD (31) and it returns to the

original screen (step S28). In step S23, when judged with it being a PPV program, it is judged whether purchase processing of the PPV program concerned has ended (step S29). If purchase processing is ending, since registration processing has already ended, it returns to the original screen, without processing anything (step S18). If purchase processing is not settled, the mentioned above program purchase screen is displayed (step S30).

[0077] Next, the judgment of whether the user performed purchase processing correctly is performed (step S31). When purchase processing is performed correctly, program information is recorded on EEPROM (326) in IRD (31) and it returns to the original screen (step S28). When purchase processing is not performed correctly, it returns to the original screen, without carrying out reservation processing (step S18). The program registered in step S28 is managed as a reservation program and if the start time of a reservation program comes, the processing according to reservation level (viewing reservation / video recording reservation) will be made.

[0078] The procedure of a reservation program is shown on drawing 18. First, the start time and current time of all programs that were reserved are compared (step S35). Also, it is judged whether either of the start time of the reserved program was in agreement with current time (step S36). If not in agreement, comparison processing (steps S35 and S36) is repeated until it is in agreement.

If in agreement, it will be judged whether the reservation program concerned is a program by which video recording reservation was carried out (step S37). If video recording reservation is carried out, it will be judged whether next the power source of IRD (31) is on (step S38). If the power source is not on, IRD (31) is turned on compulsorily (step S39). Additionally, it tunes in to the channel of the video recording reservation program concerned (step S40) and the video recording reservation program concerned is reproduced (step S41).

[0079] In step S38, when the power source of IRD (31) is on, it is judged whether the channel by which current selection is made is the same as the channel of the video recording reservation program concerned (step S42). If it is the same channel, the video recording reservation program concerned will be reproduced (step S41). If it is not the same channel, it will tune in compulsorily to the channel of the video recording reservation program concerned (step S40) and the video recording reservation program concerned will be reproduced (step S41). In step S37, when judged with it not being video recording reservation, it is judged whether next the power source of IRD (31) is on (step S43). If the power source is not on, the reservation program concerned is canceled and it ends (step S44). When the power source is on, it is judged whether the channel by which current selection is made is the same as the channel of the reservation program concerned (step S45). If it is the same channel,

the reservation program concerned will be reproduced (step S46). If it is not the same channel, it will tune in compulsorily to the channel of the reservation program concerned (step S47) and the reservation program concerned will be reproduced (step S46). Also, although how to tune in compulsorily as an example here was shown, you may make it tell that indicated the message by onscreen on TV display, without tuning in and the start time of a reservation program came.

[0080] When performing such reservation processing, it is desirable to be set up, so that all or a part of plurality of broadcasting hours of a program may not lap. Thus, the consideration indicate consideration by onscreen and it is made not to make the message for warning a user already reserve accidentally for example when it is going to reserve a reserved program and the program with which all or a part of broadcasting hours lap is required. For example, in the program guide display screen of the drawing 12 bottom, when the user has already reserved the program of "B", if user is going to reserve the program of "F" and "L", a warning message will be displayed.

[0081] Next, before explaining the viewing history display (C) of a PPV program, a reservation program display (D), an e-mail display (E), and systems testing (F), the method of presentation of a menu is explained. Although it explained that it was displayed on TV screen when the mentioned above program guide screen presses

the guide key (33G) of remote controller (33), a menu screen is displayed on TV screen and functions other than a program guide display are shown by pressing the menu screen key (33M) of remote controller (33) similarly to a list table. The method of presentation is the same as that of a program guide display and the MPEG decoder changes and outputs it to a video data by transmitting the bit map data of a display screen to the data area for an onscreen display of RAM (316) connected to the MPEG decoder (315) from CPU (321).

[0082] The example of a display of a menu screen is shown on drawing 19. In drawing, the function that can be used is shown on menu items (47), (48), (49) and (50). Cursor can be moved on a menu item and processing of the menu item chosen when a selection key (33S) pushed is performed. It is shown by a diagram that cursor exists on a menu item (47) and it is highlighted and is distinguished from other items. A cursor advances with a cursor movement key (33U) and (33D). If cursor is moved to a menu item (47) and a selection key (33S) is pressed, viewing history display processing of a PPV program will be performed. If cursor is moved to a menu item (48) and a selection key (33S) is pressed, display processing of a reservation program will be performed. If cursor is moved to a menu item (49) and a selection key (33S) is pressed, e-mail display processing will be performed and systems testing will be performed, if cursor is moved to a menu item

(50) and a selection key (33S) is pressed. Also, although three menu items are shown as an example here, it may exist in others.

[0083] First, the viewing history display of the PPV program of C is explained. This function displays in a list the information on the PPV program which already purchased and viewed listened. Since the information on the PPV program to which it viewed and listened as mentioned above is recorded on EEPROM (32E) in an IC card (32), it displays in a list using this information. The example of the viewing history display screen is shown on drawing 20. In drawing, (51) - (53) show the buttons in which a cursor advance is possible, and the title of the program, a broadcast day, a tariff, etc. are shown a list table of the PPV program which is viewed (54). Since the data of a program with which payment of an audience fee was performed about once per month and it was transmitted to the transmitting side customer management system (23) as mentioned above and it paid and processing ended are deleted from EEPROM (32E) in an IC card (32), the usually paid program that has not been settled, i.e., the PPV program to which last time paid and viewed after processing, is displayed in the PPV program viewing history display screen. Here, six programs are displayed.

[0084] If a selection key (33S) is pressed when cursor is in a button (51), it will return to the original screen. It is displayed when the number of programs that buttons

(52) and (53) are page scroll buttons and should be displayed exceeds the number of the maximum displays (here 6). If cursor is moved to a button (52) and a selection key (33S) is pressed, cursor will be moved to scrolling and a button (53) upward and if a selection key (33S) is pressed are scrolling downward and the list of programs which are not displayed in the screen can be seen.

[0085] Next, the reservation program display function of D is explained. This function indicates the list of the mentioned above charge by which viewing or video recording reservation was carried out, and free programs by list. Also, canceling is possible if user wants to cancel reservation. The example of the reservation program list display screen is shown on drawing 21. In drawing, a cursor advance can be carried out by button (55) and reservation program list items (56) - (58). A cursor advance between a button (55) and reservation program list items with a cursor movement key (33L) and (33R) moving between reservation program list items with an up and down cursor movement key (33U) and (33D). Although the number of displays of a reservation program is 3, when four or more exist, the remaining reservation programs are displayed by a vertical cursor movement key (33U) and (33D) via scrolling. For example, in drawing, if a bottom cursor movement key is pushed from the location of the reservation program list

item of 3, it will be scrolled upwards and the 4th reservation program list item will appear.

[0086] If a selection key (33S) is pressed when cursor is in a button (55), it will return to the original screen (menu screen). It is cancellable, if you want to cancel reservation if a selection key (33S) is pressed on a reservation program list item while the reservation program detail display screen as shown on drawing 22 appears and the still more detailed information on the reservation program concerned is displayed. In order to cancel, it performs by moving cursor to a Cancel button (60) and pressing a selection key (33S). Cancellation of reservation deletes the information on a program from EEPROM (326) of IRD (31). If a selection key (33S) is pressed on a button (59), it will return to the original screen (reservation program list display screen). In addition, the PPV program viewing history display screen and the reservation program list display screen can be displayed simultaneously as one menu item too.

[0087] Next, the e-mail display function of E is explained. With video and audio data, multiplex of the mail data is carried out and it is transmitted. It is usually mail of two kinds, one common to all users (common mail) and mail and addressing to an individual (individual mail. Common mail is transmitted by the packet data which all users, such as the mentioned above ECM, receive in common, and individual mail is

transmitted by the packet data which only specific users, such as EMM, can receive.

[0088] If common mail or the individual mail addressed to themselves is received, while recording the data in RAM (323) in IRD (31) or EEPROM (326), it tells the user that e-mail arrived using means, such as an icon and an LED display. User can know that the mail with an icon new when an e-mail icon is displayed on somewhere on the mentioned above program guide screen, for example, and a user displays a program guide screen arrived. An LED display makes this LED light, when LED is located in the front panel of for example, an IRD (31) case etc. and e-mail arrives. A user can be told about e-mail having arrived regardless of TV screen display in this case. In addition, an e-mail icon and LED must be reset when a user reads the mail.

[0089] The example of the e-mail display screen is shown on drawings 23 and 24. Drawing 23 is the mailing list display screen and a list of the delivered mail is displayed. Also, drawing 24 is the contents display screen of e-mail that displays the contents of the selected mail. In drawing 23, a cursor advance can be carried out to button (62) and mailing list item (63) - (66). A cursor advance between mailing list items by a button (62) and a cursor movement key (33L) and (33R), and moving between mailing list items by an up and down cursor movement key (33U) and (33D). Although the number of displays of a mailing list is 4, when five or more exist,

the remaining mail is displayed by scrolling with a vertical cursor movement key (33U) and (33D). For example, in drawing, if a bottom cursor movement key is pushed from the location of the mailing list item of 4, it will be scrolled upwards and the 5th mailing list item will appear. If a selection key (33S) is pressed when cursor is in a button (62), it will return to the original screen (menu screen).

[0090] If a selection key (33S) is pressed on a mailing list item, the contents display screen of e-mail as shown on drawing 24 will appear, and the contents of e-mail will be displayed. Here, the contents display screen of e-mail at the time of pressing a selection key (33S) in the location of the mailing list item 2 (64) is shown. In drawing 24, while the contents of e-mail are displayed, it is possible to delete (71) e-mail too. In order to delete, it performs by moving cursor to a deletion button (68), and pressing a selection key (33S). The once deleted mail is not displayed from next time. When a lot of contents of e-mail cannot display on the field of (71), the remaining contents are displayed using a buttons (69) and (70).

That is, if a selection key (33S) is pressed in the location of a button (70), the following page will be displayed, and a front page will be displayed if a selection key (33S) is pressed in the location of a button (69). If a selection key (33S) is pressed in the location of a button (67), it will return to the original screen (mailing list display screen).

[0091] Finally the systems testing screen of F is explained. This function is tested about the main interfaces of IRD (31) and displays the result. It is used in order to know the cause, when IRD (31) does not carry out normal actuation. The example of a systems testing screen is shown on drawing 25. It is possible with buttons (72) and (73) to move cursor, and it is made to move to them in drawing using a vertical cursor movement key (33U) and (33D). If a selection key (33S) is pressed when cursor is in the location of a button (72), it will return to the original screen (menu screen). If a selection key (33S) is pressed when cursor is in the location of a test button (73), the test of each test entry will be performed and the result will be displayed.

[0092] A test entry (74) is a test of receiving, and it is tested whether the signal from a satellite is correctly receivable. The test approach is usually judged according to the error rate of the data in an input processing circuit (312). As a result of testing, if normal, alphabetic characters, such as "OK", will be displayed, and if there are some problems, it will be displayed as "NG" etc. A test entry (75) is an interface test with an IC card and it is tested whether the communication link with IRD (31) and an IC card (32) is performed correctly. As a result of testing, if normal, alphabetic characters, such as "OK", will be displayed, and if there are some problems, it will be displayed as "NG" etc. A test entry (76) is the test of the telephone line and it is

tested whether IRD (31) is correctly connected to the telephone line. As a result of testing, if normal, alphabetic characters, such as "OK", will be displayed, and if there are some problems, it will be displayed as "NG" etc.

[0093] Next, plurality of broadcast service receiving set that can receive plurality of digital broadcast services is explained. Plurality of broadcast service receiving set is a receiving set that can receive broadcast services, such as digital broadcasting of plurality of same media (for example, satellite broadcasting service) or different media (for example, satellite broadcasting service and terrestrial broadcasting), by one set. The image of the receiving set that can receive two digital satellite broadcasting is shown on drawing 26. The signal outputted from the 1st transmitting antenna is received by the 1st receiving antenna (30) via a satellite (1). The signal outputted from the 2nd transmitting antenna (24) is received by the 2nd receiving antenna (35) via a satellite (10). The signal received with the 1st and 2nd receiving antennas is inputted into a receiving set (36). The video and the audio signal that were chosen and decoded with the receiving set (36) are outputted to TV (34). Also, it is possible to share the mentioned above 1st and 2nd antennas with one antenna according to the physical relationship of two satellites.

[0094] Also, the image of the receiving set that can receive digital satellite broadcasting and terrestrial

digital broadcasting to drawing 27 as another example is shown. The signal transmitted from the transmitting antenna for terrestrial digital broadcasting (25) is inputted into a satellite and the receiving set for ground waves (38) with the signal that was received by the antenna for receiving set side terrestrial broadcasting (37) and was received with the antenna for satellite broadcasting services (30). The video and the audio signal that were chosen and decoded with the satellite and the receiving set for ground waves (38) are outputted to TV (34).

[0095] Next, the example of the internal configuration of plurality of services receiving set is shown drawing 28. Here, the configuration of the receiving set that can receive two satellite broadcasting services is shown. In drawing, the same number is given to what has the same function as on drawing 10 and repetition of explanation is omitted. When receiving several satellite broadcasting services, a tuner and input process differ from a descramble circuit as a single satellite broadcasting service receiver and hardware. In drawing 28, the tuner (327) and the input processing circuit (328) are displayed with one block as a common circuit. This is because a common circuit can be easily constituted from it being the same satellite broadcasting service of a tuner and an input processing circuit. Both the signal (3100) from the 1st receiving antenna for satellite broadcasting services (30) and the signal (3101) from the 2nd

receiving antenna for satellite broadcasting services (35) can be inputted into a common tuner (327).

[0096] Also, this common tuner (327) consists of that the frequency bands of the transponder used by each satellite broadcasting service differ, so that it can correspond to the signal of a larger frequency band. Also, it is extent from which the method of a digital recovery or an error correction itself is the same and a part of parameters (for example, rate of coding of a convolutional code etc.) differ about input process in many cases, and common use is easy.

[0097] The example of the configuration of the descramble circuit of a receiving set, although various methods could be considered is shown here. If the configuration of a scramble circuit is completely the same, it is also possible to build in IRD (31) like on drawing 10, but when not the same, as shown on (32CA1) and (32CA2) of drawing 28, the method that dedicates in a card and is considered as a removable configuration can be considered as a method in consideration of prospective expandability. According to such a configuration, when receiving the case where a scramble method is changed, for example, another digital satellite broadcasting, correspondence becomes possible only by exchanging this card. Since a high-speed interface is required compared with the example of the mentioned above drawing 10, as for the card used here, a parallel interface type PC card is used. Also, the

processing circuit of the limited input signal in the mentioned above IC card (32) is built in too.

[0098] Two slots are required for IRD (31) to the PC cards of two sheets. The example of a configuration of this PC card is shown on drawing 29. Although this PC card has composition that built the descramble circuit (314) in the IC card (32) of drawing 9 and the function of each part is the same, ECM, the approach of encryption of EMM, etc. have high possibility of differing. The 1st card (32CA1) carries out descrambling processing only of the 1st video and audio signal of digital satellite broadcasting, and outputs them to the 2nd PC card (32CA2), without processing anything to the signal of the 2nd digital satellite broadcasting. In the 2nd PC card (32CA2), descramble processing only of the 2nd video and audio signal of digital satellite broadcasting is carried out and it outputs to a demultiplexer circuit (313), without processing anything to the signal of the 1st digital satellite broadcasting.

[0099] CPU (321) in IRD (31) will be transmitted to the 1st PC card (32CA1), if the limited input signals (EMM, ECM, etc.) of the 1st digital satellite broadcasting are received, and if the limited input signal of the 2nd digital satellite broadcasting is received, it will be transmitted to the 2nd PC card (32CA1). Also, it is possible to dedicate the reception control function of this limited input signal in a PC card.

[0100] Next, the example of the user interface for choosing the program of each digital satellite broadcasting is explained. When digital satellite broadcast service (next, service) changes, it is being, when the contents and the contents of a menu of the mentioned above program information may also be changed. If the item for changing service is prepared in one of the menu items and service is changed to it as easiest approach as shown on drawing 30, it is possible to display the program guide and menu item corresponding to the changed service. Drawing 30 shows the example of a menu change from the 1st digital satellite broadcast service (satellite broadcasting service A) to the 2nd digital satellite broadcast service (it is called satellite broadcasting service B).

[0101] In (a) of drawing, it is an item for a menu item (77) to change service, and the menu item that can be used for a menu item (78) with the service by which current selection is made is shown list table. When cursor is in a menu item (77), the service change screen of (b) appears by pressing a selection key (33S). In (b), (81) is the check BOX for checking, when choosing satellite broadcasting service A, and (82) is the check BOX for checking, when choosing satellite broadcasting service A. The check mark is attached to the check BOX of service of the way chosen, and it is shown that the current satellite broadcasting service A is chosen. A check mark is attached only to one of the checks BOXes.

When changing service, it is made to move to the check BOX of service to change cursor using a cursor movement key and performs by pressing a selection key (33S).

[0102] For example, in changing to satellite broadcasting service B, by moving cursor to Check BOX (82) and pressing a selection key (33S), the check mark of Check BOX (81) disappears and a check mark appears in Check BOX (82). After changing, by carrying out a cursor advance to the OK button (79), and pressing a selection key (33S), a change is performed and it returns to a menu screen. If cursor is moved to a Cancel button (80) and a selection key (33S) is pressed, it will return to the original menu screen, without canceling and changing processing. The drawing (c) shows the menu screen at the time of changing to satellite broadcasting service B. Here, satellite broadcasting service B shows the example in case there is no mail service, and the item of the mail currently displayed in this drawing (a) is deleted. Thus, if the change of service is performed, the program guide of service with which the display of the mentioned above program guide was chosen will be displayed too. Thus, independent processing is performed to each satellite broadcast service, only the signal of the service chosen is processed and data are managed separately too.

[0103] For example, if satellite broadcasting service A is then chosen when the purchase history display of a PPV program is chosen from a menu screen, EEPROM in the

PC card for satellite broadcasting service A will be accessed, and a PPV program viewing history screen will be displayed based on the viewing history data of a PPV program. The PPV viewing program of a broadcasting satellite B is not displayed in that case. Also, the information on the reserved program is recorded on another field of EEPROM (326) of IRD (31), in case it displays the program that the reservation program display was chosen from the menu item and was reserved, reads only the reservation program information on the service chosen from EEPROM (326) and displays it. Other functions are same.

[0104] As another example of a configuration, the example of the receiving set that can receive digital satellite broadcasting and terrestrial digital broadcasting is shown on drawing 31. Since a modulation technique differs from error correcting system when media vary, it is difficult to share a tuner and an input circuit in many cases and it is necessary to have it independently, respectively. In drawing, the signal (3102) from a terrestrial digital broadcasting receiving dish is inputted into the input circuit (330) for terrestrial broadcasting, after getting over with the tuner (329) for terrestrial broadcasting. The output of the input circuit (330) for terrestrial broadcasting is inputted into a demultiplexer circuit (331), after being inputted into the PC card for limited receptions of terrestrial broadcasting (32CA4) and carrying out descrambling processing.

[0105] Alternatively, the output signal of the input processing circuit (312) for satellite broadcasting services is inputted into a demultiplexer circuit (331), after being inputted into the PC card for limited reception of satellite broadcasting service (32CA3) and carrying out descrambling processing. The selection circuitry is prepared in the input stage of a demultiplexer circuit (331), either satellite broadcasting service or terrestrial broadcasting is chosen, and to the signal of the this chosen broadcast, it is constituted, so that the same processing as the mentioned above demultiplexer circuit (313) may be performed. The connection configuration of the case of drawing 28 and PC card changed, when it was the same media, the PC card was connected to the cascade, but when media vary, the output of each PC card is inputted into a demultiplexer circuit, without carrying out cascade connection. This is because it was independent of the tuner and the input processing circuit. However, if it is able to carry out the tuner and input processing circuit of different media by improvement in the accumulation technique of LSI, it can correspond altogether with the configuration of drawing 28. Or by preparing a selection circuitry in the output of each input processing circuit, and constituting so that one of satellite broadcasting service and the terrestrial broadcasting may be chosen and outputted, cascade connection of the PC card can be carried out and it can be constituted.

[0106] In the case of the example of drawing 31, the channel selection of a program is performed by CPU (321) by taking out directions to a tuner, an input processing circuit, a PC card and a demultiplexer circuit. Also, what is necessary is just to use the signal from the receiving set of the additional information prepared separately of the case where it is transmitted by the media that are different separately, although premised on being sent to the actual contents of a program and coincidence by additional information, such as program information added to the contents of a program, in drawing 31.

[0107] Next, the example of this invention is explained. Also, only the part used as the description is explained and explanation is omitted about the same part as in the above mentioned explanation. Although the configuration of the hardware of a receiver may be the same as configuration as shown on drawing 28 and 31, the arts of EEPROM (326) in IRD (31) or the data in a PC card (32CAs 1-4) differ. Here, the receiving set that can receive two satellite broadcasting services (satellite broadcasting service A and satellite broadcasting service B) is explained as an example, and it explains based on the configuration of the receiving set of drawing 28.

[0108] First, the example that communalizes only a menu item as 1st operation embodiment is shown. It is indicated another screen display by the program guide.

Here, the menu item that can be used by each satellite broadcast service is carried out as drawing 32.

[0109] As shown on drawing 32 the function of the purchase history display of a PPV program, a reservation program display, mail and systems testing, either of the possible broadcast services, satellite broadcasting service A and in addition, interactive service functions, such as a quiz show are made possible.

[0110] The example of a display of the menu item communalized to drawing 1 is shown. By a diagram, the menu item of satellite broadcasting service A or the menu item of satellite broadcasting service B is displayed simultaneously (85). It is shown on the service discernment viewing area (86) whether it is what each menu item can use by which satellite broadcasting service. For example, if it is shown on the item of a purchase history display of a PPV program that it can use by both satellite broadcasting service A and the satellite broadcasting service B and this item is chosen, it is shown that the history of both services is displayed. Also, it is shown that the item of an interactive service function can be used by satellite broadcasting service A. This menu screen is displayed on TV (34) screen by operating the menu screen display button on remote controller 33.

[0111] In this operation embodiment, the service change item (84) is displayed because of which satellite broadcast service a program guide is displayed in a

program guide display needs to be chosen and it affects neither a menu display nor its contents by changing service. Specifically, if service is changed from satellite broadcasting service A to satellite broadcasting service B and the guide key (33G) of remote controller is pressed after it, the program guide of satellite broadcasting service B will be displayed.

[0112] In order to perform this display, the identification information for identifying the satellite broadcast service corresponding to the service item shown on drawing 1 and each service item is recorded on ROM connected to CPU 321, and the data for performing a predetermined display to the MPEG decoder 315 from CPU 321 are sent based on the information on this pair.

[0113] In drawing 1, the example of a display of the purchase history screen of the PPV program displayed when the selection directions of the purchase history of a PPV program are carried out with remote controller is shown on drawing 2. By a diagram, all the PPV programs to which it viewed and listened and that were purchased by both satellite broadcast services are shown the list table. The service discernment display (87) is added compared with the example of a display of the mentioned above drawing 20. By this, it can distinguish whether it is the PPV program purchased by which satellite broadcast service. Although a PC card (32CA1) and the data currently recorded inside (32CA2) may be used as an art of data, in consideration of the

improvement of the display speed by reducing communalization of display information and the access frequency to a card, the information on the PPV program to which it viewed and listened is recorded on EEPROM (326) in IRD (31) too. The data that should be recorded are data required in order to display a PPV program viewing history screen, and record only the data common sent to both services. Program information displayed on a PPV program viewing history screen is made only into the information currently recorded on this EEPROM (326), and program information peculiar to each service is not displayed.

[0114] Also, service discernment flag data are recorded on EEPROM (326) with program information. This service discernment flag shows whether it is the PPV program broadcast with which service and in the case of the common receiving set of two services is identifiable like this operation embodiment at 1 bit. The mentioned above service discernment display (87) is performed using this service discernment flag. Also, when the field to store is made to correspond to plurality of broadcast services and is being divided, it is not necessary to store identification information only by writing program information in a corresponding field. Also, this is the same about the following explanation.

[0115] Next, in drawing 1, the example of the reservation program list display screen displayed when the selection directions of the "reservation program" are

carried out with remote controller is shown on drawing 3. By a diagram, all the programs reserved by both satellite broadcast services are shown in the list table. The service discernment display (88) is added compared with the example of a display of the mentioned above drawing 21. By this, it can distinguish whether it is the program reserved by which satellite broadcast service. The information on the program reserved like PPV program viewing history as an art of data is recorded on EEPROM (326) in IRD (31) and package management is carried out. The data that should be recorded are data required in order to display a reservation program screen and record required data from the data sent common to both services. However, in order to check the lap of the broadcasting hours of a program, so that it may mention later, the data of the length of the start time of a program and end time or a program are recorded surely.

[0116] Broadcast service discernment flag data as well as the case of PPV program viewing history are recorded on EEPROM (326). This broadcast service discernment flag shows whether it is the program reserved by which broadcast service and, in the case of the common receiver of two services, is identifiable like this operation embodiment at 1 bit. The mentioned above service discernment display (88) is performed using this broadcast service discernment flag.

[0117] In case a program is newly reserved, it is confirmed whether acquire the start time of the program

that it is going to reserve and end time or the information on the length of a program (multiplex is usually carried out as some program guide data) and all or a part of already reserved program and broadcasting hours have lapped. If it has lapped, it is necessary to show the warning message by onscreen on TV screen and to warn a user.

[0118] Like this example, if package management of the information on the reservation program of two broadcast services is carried out, also when it may lap in the broadcast service compartment from which a reservation program differs, processing of carrying out an alarm display will be attained. Also, for example, when the program and broadcasting hours of satellite broadcasting service B which the program that it was going to reserve by satellite broadcasting service A had already purchased have lapped, it can process satisfactory. In the case where the program (not displayed on the program guide of satellite broadcasting service A) of satellite broadcasting service B is already reserved in the same time zone when it is specifically going to reserve the program currently broadcast by satellite broadcasting service A from the program guide of satellite broadcasting service A, the program of satellite broadcasting service B is already reserved in the same time zone. A warning message is displayed on the program guide screen of satellite broadcasting service A.

Also, blinking and warning of display means, such as LED located in the front face of a receiving set is considered. In addition, the detailed information display screen of a reservation program is the same as on drawing 22.

[0119] Also, although the screen of a check of reservation and the display screen of the purchase history of a PPV program are expressed as a separate screen in this example, it is also possible to display in a list the program to which combines these two screens, reserves with one kind of screen as the program of PPV to which it already viewed and listened, and it is not yet viewing. In this case, while being able to check those contents and a program price and being able to check a contents of a program, start and finishing time, non view and listened, a PPV program viewing etc. constitutes a screen, so that cancellation of reservation or purchase may be possible.

[0120] Next, the example of the display screen of a mailing list displayed by drawing 1, when the selection directions of "e-mail" are carried out with remote controller is shown on drawing 4. By a diagram, it indicates all mail of both satellite broadcast services. The service discernment display (89) is added compared with the example of a display of the mentioned above drawing 23. By this, it can distinguish of which satellite broadcast service it is mail. As an art of data, like processing of the mentioned above reservation program,

the contents of the received mail are recorded on EEPROM (326) in IRD (31) and package management is carried out. Broadcast service discernment flag data as well as the case of the mentioned above PPV program viewing history and reservation program processing are recorded on EEPROM (326). This broadcast service discernment flag shows whether it is the program reserved by which broadcast service and, in the case of the receiving set of two broadcast services is identifiable like this operation embodiment at 1 bit. Also, the contents display screen of e-mail is the same as drawing 24.

[0121] The example of a display of the systems testing screen finally displayed by drawing 1, when "systems testing" is chosen with remote controller is shown on drawing 5. Two test entries of a card interface are displayed compared with drawing 25 ((90) 91). This is the mentioned above PC card (32CA1) and (32CA2) because two exist. In drawing 5, the first card interface test is an object for satellite broadcasting service A and the 2nd card interface test is an object for satellite broadcasting service B.

[0122] Also, by communalizing both program guides of service as 2nd operation embodiment explains the method that makes service change processing unnecessary. That is, press of the guide key (33G) of remote controller displays the common program guide with which all of the program of satellite broadcasting

service A and the program of satellite broadcasting service B are contained. In order to communalize a program guide, it is required to communalize the index table for the mentioned above program guide by two broadcast services and to manage the program of both broadcast services on one table. It is possible to display the channel of satellite broadcasting service B, for example after the channel of satellite broadcasting service A as the method of presentation.

[0123] The example of a display in this case is shown on drawing 6. Drawing shows the channel near the boundary line of the channel of satellite broadcasting service A and the channel of satellite broadcasting service B, (92) is the channel of satellite broadcasting service A and (93) is the channel of satellite broadcasting service B. The channel (100 channels) of the beginning of satellite broadcasting service B is displayed on the degree of the channel (770 channels) of the last of satellite broadcasting service A. The service name is attached in order to show of which service it is a channel beside a channel number. According to such a method, both a menu and a program guide can be communalized and the processing that changes service becomes unnecessary. Thus, the service change item (84) in the example of a menu display in the 1st operation embodiment (drawing 1) becomes unnecessary.

[0124] Also, even if it is the case of the receiving set of different media (for example, satellite broadcasting service, terrestrial broadcasting and cable transmission, transmission by the telephone line, etc.), the difference of the configuration of hardware with the common receiver of the same media shown with this operation embodiment does not influence this operation embodiment and can be realized by the same technique.

[0125] Although the mentioned above explanation made clear the example using remote controller as the user's input device to a receiving set, it is also possible for various manual operation buttons to be arranged on the body of a receiving set and to make it constitute an input device and to connect a personal computer to the receiving set of an example and to control a receiving set from a personal computer.

[0126] And, although the so-called receiving set explained in the example what is constituted independently to be TV, the configuration incorporated in TV or VTR is possible too. Also, it is possible to incorporate a receiving set into some personal computers and to constitute equipment.

[0127]

[Effect of the invention] In case a check and mail of the viewing history of a PPV program or a reservation program are displayed by carrying out integrated management of the menu item in the receiving set that can receive a plurality of broadcast services according to

this invention, the plurality of services can be collectively indicated by list. Also, it becomes possible to perform management of the overlap of the broadcasting hours of a reservation program etc. regardless of broadcast service and to prevent the problem at the time of program reservation.

[Brief description of the drawings]

[Drawing 1] is the explanatory view showing the example of a menu screen display of the common used receiver according to this invention.

[Drawing 2] is the explanatory view showing the example of a PPV viewing history screen display of the common used receiver according to this invention.

[Drawing 3] is the explanatory view showing the example of the reservation program list display screen of the common used receiver according to this invention.

[Drawing 4] is the explanatory view showing the example of the mailing list display screen of the common used receiver according to this invention.

[Drawing 5] is the explanatory view showing the example of a system testing screen of the common used receiver according to this invention.

[Drawing 6] is the explanatory view showing the example of a display of the common program guide screen of the common used receiver according to this invention.

[Drawing 7] is the explanatory view showing digital satellite broadcasting system.

[Drawing 8] is the explanatory view showing the example of a limited reception system configuration of a transmitting side.

[Drawing 9] is the explanatory view showing the example of a limited reception system configuration of a receiving side.

[Drawing 10] is the block diagram showing the configuration of a digital broadcasting receiver (IRD).

[Drawing 11] is the explanatory view showing the example of key arrangement of the remote controller for digital broadcasting receivers.

[Drawing 12] is the mimetic diagram showing a program guide screen.

[Drawing 13] is the mimetic diagram showing a display table.

[Drawing 14] is the flow chart that shows a part of display process procedure of a program guide screen.

[Drawing 15] is the explanatory view showing the example of a PPV program purchase screen display.

[Drawing 16] is the explanatory view showing the example of a program reservation screen display.

[Drawing 17] is the flow chart that shows program selection procedure.

[Drawing 18] is the flow chart that shows reservation program procedure.

[Drawing 19] is the explanatory view showing the example of a menu screen display in a common receiving set.

[Drawing 20] is the explanatory view showing the example of a PPV program viewing history screen display in a common receiving set.

[Drawing 21] is the explanatory view showing the example of a reservation program list display screen display in a common receiving set.

[Drawing 22] is the explanatory view showing the example of a reservation program display screen display in a common receiving set.

[Drawing 23] is the explanatory view showing the example of a mailing list display screen display in a common receiving set.

[Drawing 24] is the explanatory view showing the example of the contents display screen display of e-mail in a common receiving set.

[Drawing 25] is the explanatory view showing the example of a systems testing screen display in a common receiving set.

[Drawing 26] is the explanatory view showing the system of the common receiving set that can receive two satellite broadcasting services.

[Drawing 27] is the explanatory view showing the system of the common receiving set that can receive satellite broadcasting service and terrestrial broadcasting.

[Drawing 28] is the block diagram of a common receiving set.

[Drawing 29] is the block diagram showing the internal configuration of a PC card.

[Drawing 30] is an explanatory view for explaining the service change approach in a common receiving set.

[Drawing 31] is the block diagram of a common receiving set.

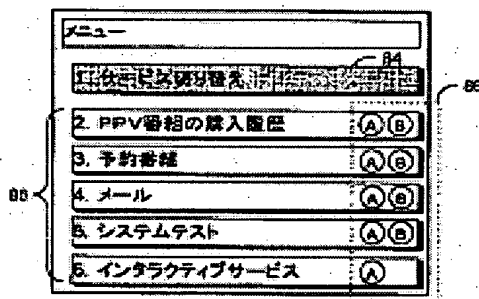
[Drawing 32] is the explanatory view showing the menu item in plurality of broadcast services.

[Description]

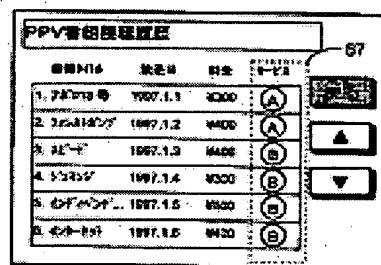
85 Menu Item Displayed

86 Service Discernment Viewing Area

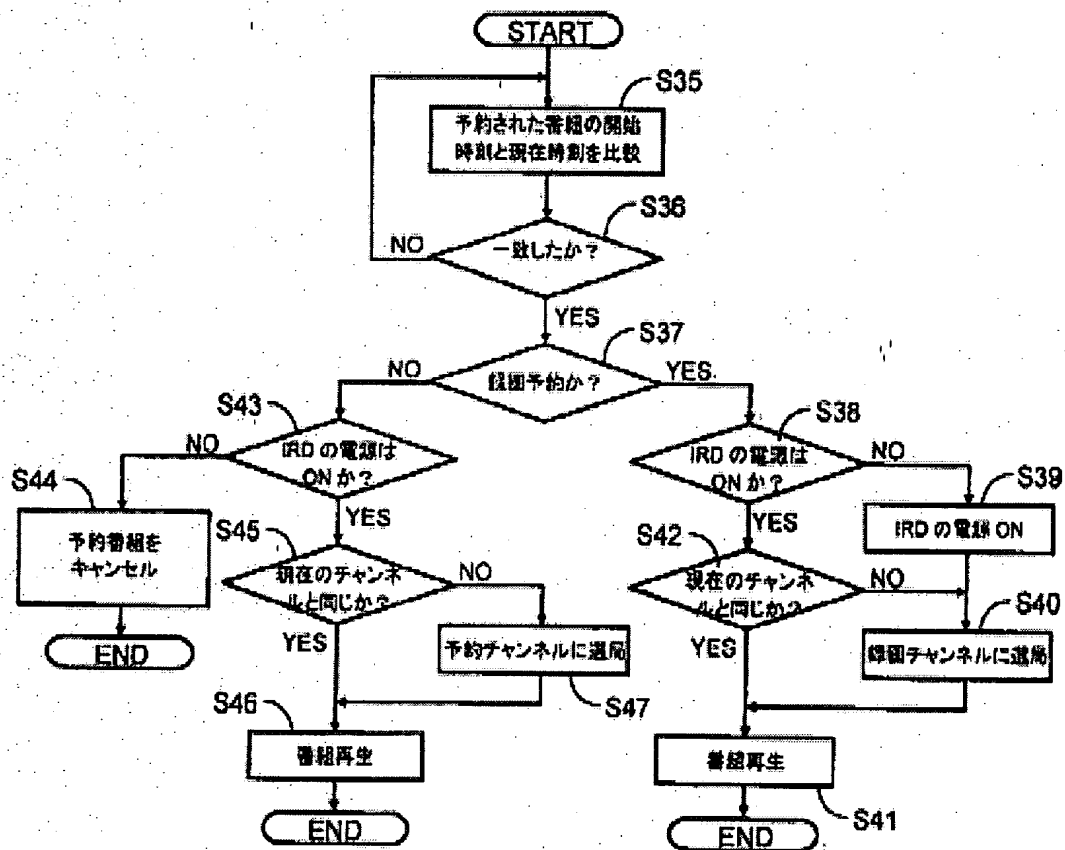
Drawing 1



Drawing 2



Drawing 18



Drawing 4 Drawing 5 Drawing 11

メニュー

1. 衛星通の材料心せ (A)

2. 同時展開切れの材料心せ (A)

3. チャンネル内容設定の材料心せ (B)

4. チャンネル通の材料心せ (B)

システムテスト

1. 送信機 (OK)

2. カードインターフェース (A) (OK)

3. カードインターフェース (B) (OK)

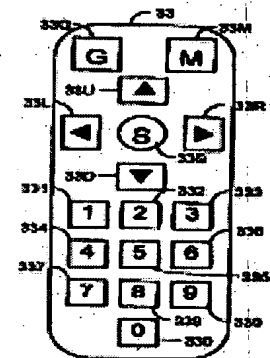
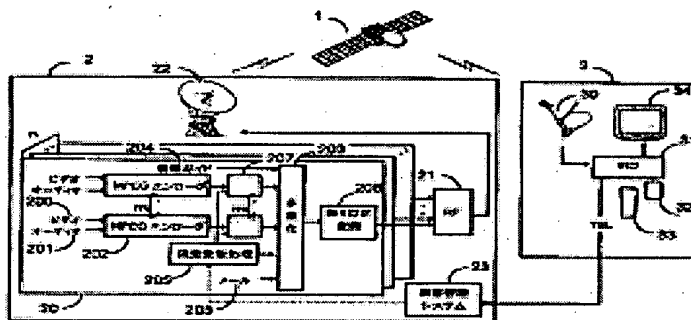
4. 電源回路 (OK)

【図6】

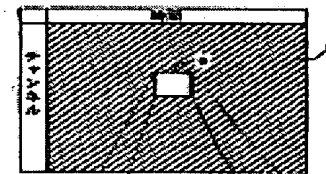
番組ガイド(衛星放送A+衛星放送B)

	9:00	9:30	10:00	10:30	11:00
CH768 (A)					
CH769 (A)					
CH770 (A)					
CH100 (B)					
CH101 (B)					

【図7】

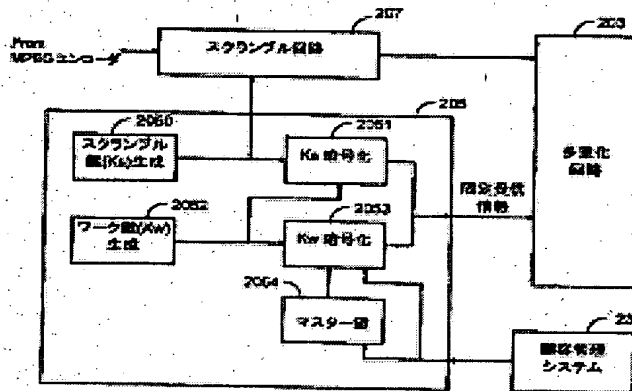


【図12】

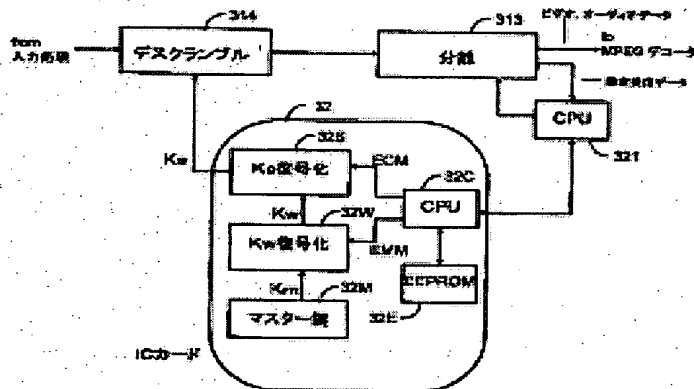


	9:00	9:30	10:00	10:30	11:00
CH 2	A		B		
CH 4	C	D	E	F	G
CH 6	H		I		
CH 8	K	L	M		
CH 10	N	O	P		

Drawing 8

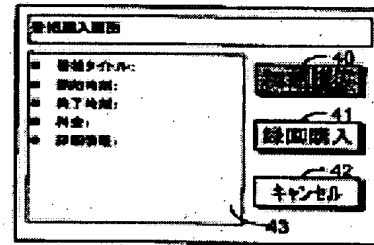


【図9】

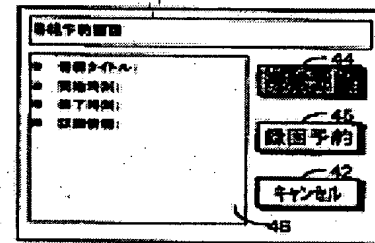


【図19】

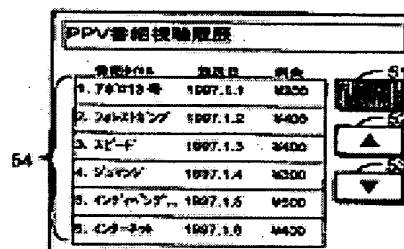
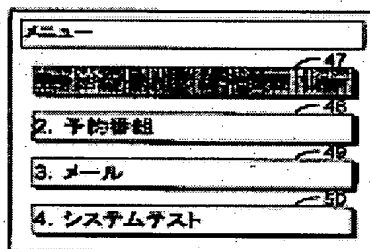
Drawing 15



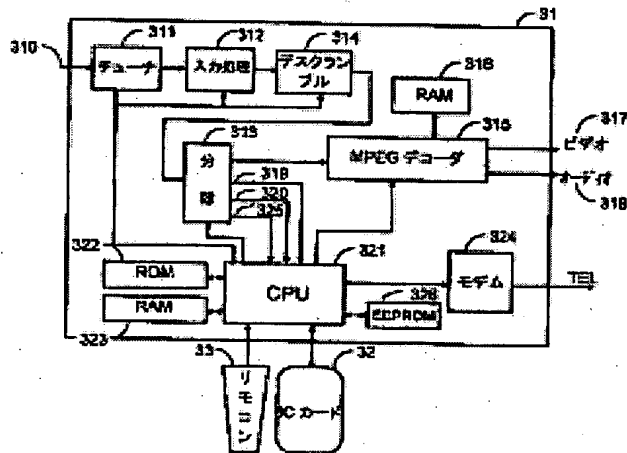
【図16】



【図20】



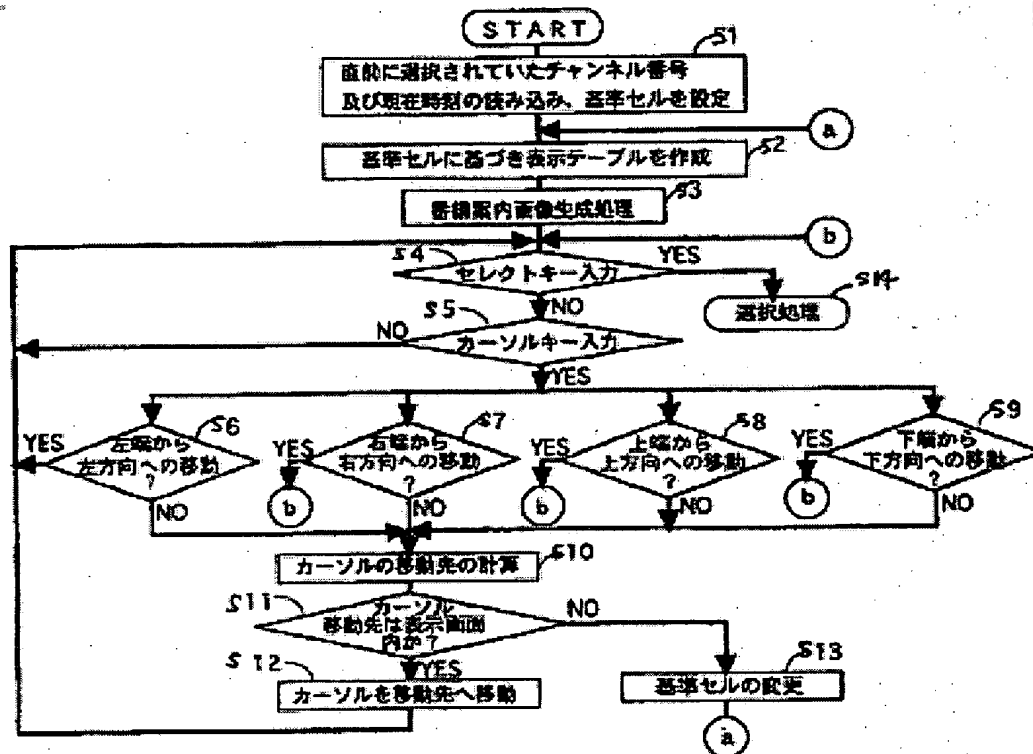
Drawing 10



Drawing 21

予約番組			
番組ID	放送日時	料金	
1. 1131-9-	1997.1.7 10:00~12:00	3300	55
2. プログラム	1997.1.7 13:00~15:00	00	67
3. プログラム	1997.1.8 19:00~20:00	00	68

【図14】



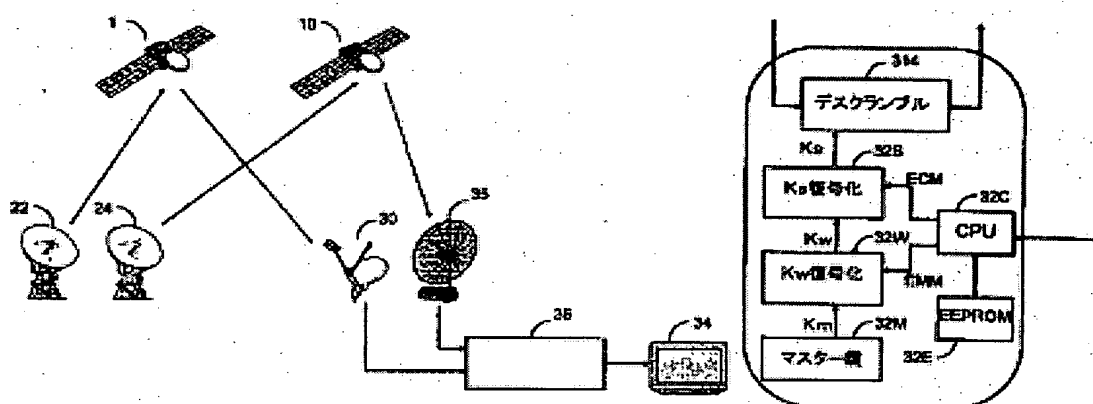
Drawing 23

メール	
1. 既婚者のお知らせ	53
2. 同僚結婚されたお知らせ	54
3. チャンネル内婚変更のお知らせ	56
4. ファンメル追加のお知らせ	56

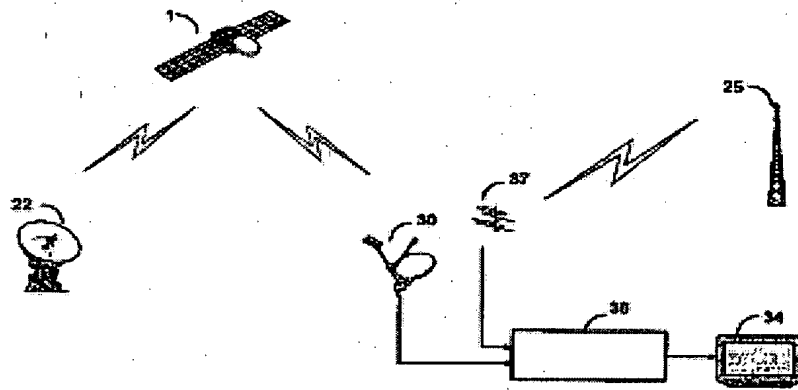
【圖 25】

システムテスト	
1. 実行回数	OK ⁷⁴
2. 10カードインターフェース	OK ⁷⁵
3. 電源回路	OK ⁷⁶

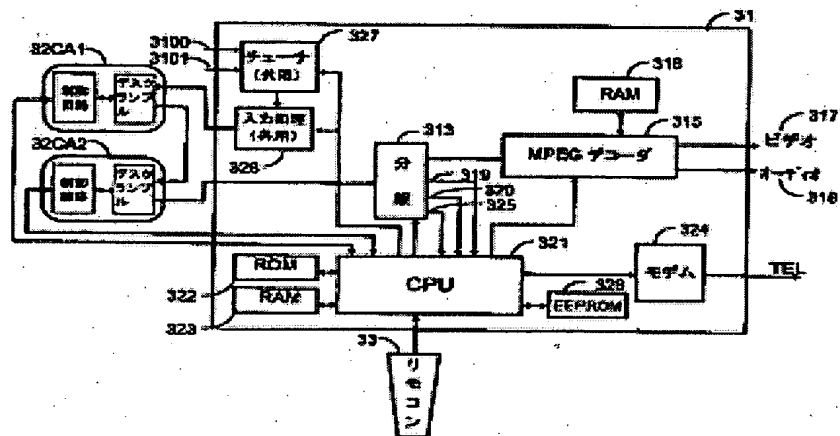
[1920]



Drawing 27



【図28】

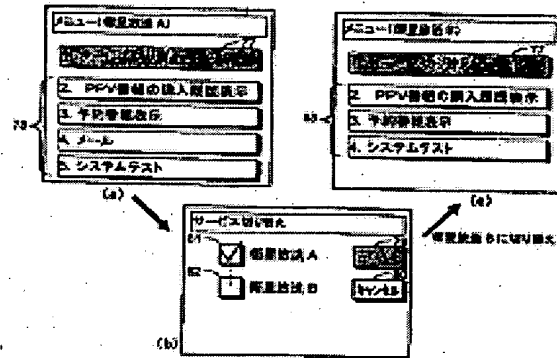


【図32】

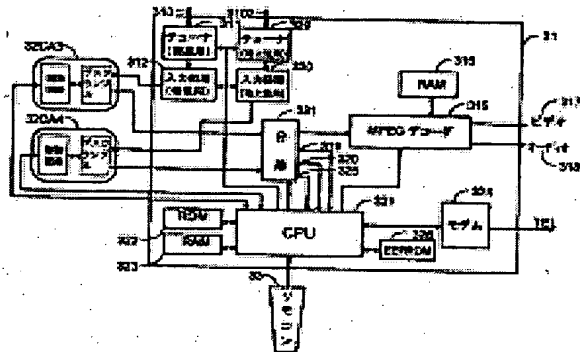
各機能部とサービスと利用できるメニュー項目

機能部名	サービス項目
PPV番組の購入履歴表示	PPV番組の購入履歴表示
予約番組表示	予約番組表示
メール	メール
システムテスト	システムテスト
インタラクティブサービス	

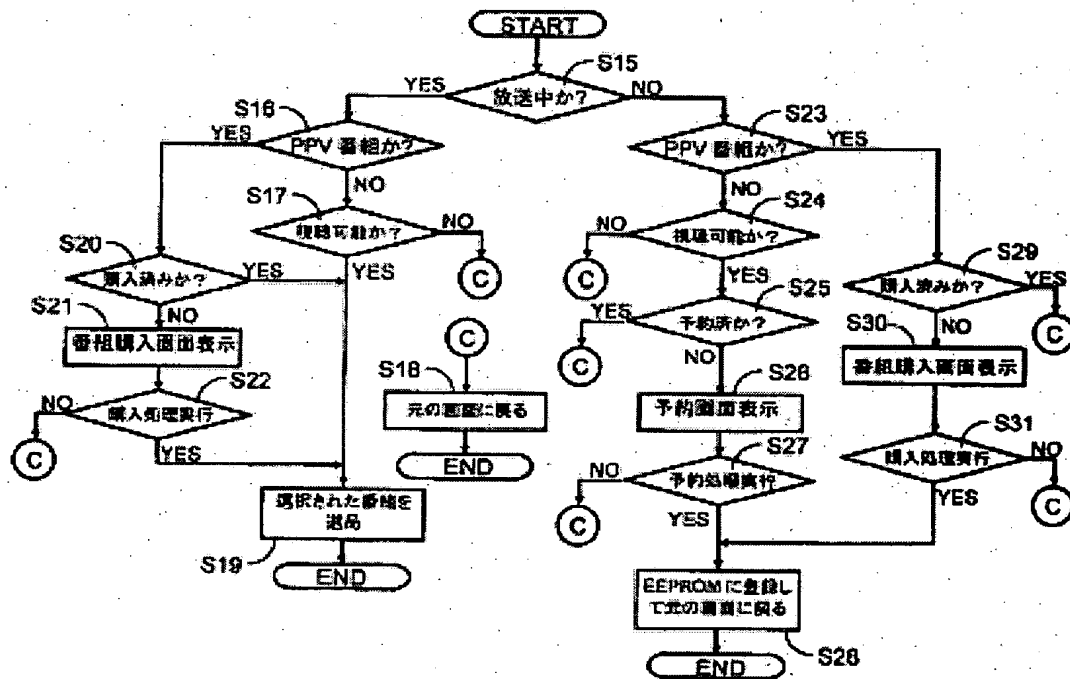
Drawing 30



【図31】



Drawing 17



Drawing 13

(1, 0)	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)
(2, 0)	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)
(3, 0)	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)
(4, 0)	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)
(5, 0)	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)

Drawing 3

予約番組			
番組ID	放送日時	料金	予約
1. H&A-サ	1997.1.7 15:00~12:00	1000	(A) <input checked="" type="radio"/>
2. Y&G-サ	1997.1.7 13:00~15:00	500	(B) <input type="radio"/>
3. D&A-サ	1997.1.8 18:00~20:00	500	(C) <input type="radio"/>